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EDUCATION

Ph.D. (*expected May 2013*), Geological Sciences, University of Colorado, Boulder CO & University of Iceland, Reykjavik, Iceland. Dissertation (Dual PhD program): *Evolution of Holocene climate and glacier activity in Iceland inferred from sedimentary archives*, Advisors: Dr. Gifford Miller (Colorado), Dr. Áslaug Geirsdóttir (Iceland)

M.S. (Dec. 2011), Civil, Environmental, and Architectural Engineering, University of Colorado, Boulder CO. Degree Program: *Hydrology, Water Resource Engineering, and Environmental Fluid Mechanics*, Advisor: Dr. John Crimaldi

Graduate Certificate (May 2010), Hydrologic Sciences Graduate Program, University of Colorado, Boulder CO. *Interdisciplinary academic curriculum focusing on quantitative studies of water in the environment*, Advisors: Dr. John Pitlick, Dr. Diane McKnight

B.A. (*cum laude* May 2005), Geological/Biological Sciences, Colby College, Waterville ME. Senior Project: *An analysis of megafloora assemblages in a late Paleocene bog deposit, central North Dakota*, Advisor: Dr. Robert Nelson

RESEARCH INTERESTS

Global change, glacier geology, glacier hydrology, Quaternary paleoclimatology, geomorphology

RELEVANT UNIVERSITY GRADUATE LEVEL COURSEWORK

Advanced Geomorphology; Paleoclimatology & Paleoceanography; Sediment Transport Mechanics; Differential Equations with Linear Algebra (undergraduate); Groundwater Hydrology; Quaternary Dating Methods; Limnology; Snow Hydrology; Geomechanics; Glaciology; Environmental Fluid Mechanics; Numerical Methods in Civil Engineering; Quantitative Methods in Engineering; Multiscale Hydrology; GIS Modeling Applications

DESCRIPTION of THESIS PROJECT

My current research interests involve using multiple proxy data sources, contained in geologic records with high temporal resolution, to evaluate the timing and magnitude of Arctic/alpine glacier and environmental responses to climate variability. For my PhD thesis, I have been investigating the evolution of Iceland's ice caps through the Holocene (with emphasis on periods of rapid change) and how they responded to natural climate forcing mechanisms (namely changes in insolation and volcanic emissions). Toward this end, I have targeted glacially derived sediments from a large proglacial lake adjacent to Langjökull (~925 km²), the second largest ice cap in Iceland, to develop a high-resolution (annual to multi-decadal) record of glacier activity and environmental change in the region for the past ~10 ka. In the past few years, I have constructed a varve chronology and evaluated a suite of glacier and environmental proxies to provide one of the few continuous, high-resolution records of climate and glacier activity from interior Iceland. I am currently using seismostratigraphic profiles of the basin sediment fill, in conjunction with a numerical ice sheet model, to constrain Langjökull's Holocene erosion rates, including the influence of glacier dynamics on sediment production and transport. Most recently, I have begun a side project focusing on the deglacial history and Holocene climate of various elevations in the Teton mountain range using multiple proxies contained in lake sediments from lakes positioned along elevation transects.

PUBLICATIONS

- Larsen, D.J.**, and Gill, E., In Prep. Drainage Network Evolution: Testing the relationship between basin age and empirical parameters of river networks. *Geophysical Research Letters*.
- Larsen, D.J.**, Miller, G.H., Geirsdóttir, Á., Flowers, G., In Prep. Holocene erosion rates and sediment yield from Langjökull ice cap. *Geomorphology*.
- Ólafsdóttir, K.B., Geirsdóttir, Á., Miller, G.H., **Larsen, D.J.**, In Prep. Climate inferences from high-frequency cyclicity in a 3 ka varve thickness record from Hvítárvatn, Iceland. *Journal of Geophysical Research: Earth Surface*.
- Larsen, D.J.**, Miller, G.H., Geirsdóttir, Á., In Prep. The peculiar behavior of glaciers terminating in a closed water body. *Journal of Glaciology*.
- Larsen, D.J.**, Miller, G.H., Geirsdóttir, Á., Flowers, G., In Prep. Glacier fluctuation and sediment yield: investigating the relationship between ice cap extent and sediment flux using varved lake sediments, Iceland. *Geophysical Research Letters*.
- Geirsdóttir, Á., Miller, G.H., **Larsen, D.J.**, Ólafsdóttir, S., *Submitted*. Abrupt Climate Transitions Recorded in Synchronized Holocene Glacial and Non-glacial Lacustrine Records in Iceland. *Quaternary Science Reviews*.
- Larsen, D.J.**, Miller, G.H., Geirsdóttir, Á., Ólafsdóttir, S., 2012. Non-linear Holocene climate evolution in the North Atlantic: a high-resolution, multi-proxy record of glacier activity and environmental change from Hvítárvatn, central Iceland. *Quaternary Science Reviews* 39, 14-25.
- Miller, G.H., Geirsdóttir, Á., Zhong, Y., **Larsen, D.J.**, Otto-Bliesner, B.L., Holland, M., Bailey, D.A., Refsnider, K.A., Lehman, S.J., Southon, J.R., Anderson, C., Björnsson, H., Thordarson, T., 2012. Abrupt onset of the Little Ice Age triggered

by volcanism and sustained by sea-ice/ocean feedbacks. *Geophysical Research Letters* 39, L02708, doi:10.1029/2011GL050168.

Larsen, D.J., Miller, G.H., Geirsdóttir, Á., Thordarson, T., 2011. A 3000-year varved record of glacier activity and climate change from the proglacial lake Hvítárvatn, Iceland. *Quaternary Science Reviews* 30, 2715-2731.

AWARDS, FELLOWSHIPS & GRANTS

The Boyd Evison Graduate Fellowship “*Glaciers and Climate in the Alpine Zone: A continuous, multi-proxy record of Holocene glacier activity and environmental change at Grand Teton National Park*”; \$9,924.54 (May 2012).

University of Colorado Graduate Student Dissertation Fellowship “*Support to pursue dissertation research and writing*”; \$6,000 (June-August 2012)

W.O. Thompson Award, University of Colorado, Department of Geological Sciences Graduate Student Award “*Support for lake coring excursion to central Iceland highlands*”; \$1,000 (April 2012)

Switzerland State Secretariat for Education and Research *ThinkSwiss* Graduate Student Travel Fellowship; “*Support to attend 11th annual NCCR Climate Summer School, Ticino, Switzerland*”; \$1,400 (March 2012).

University of Wyoming-National Park Service (UW-NPS) Research Grant “*Climate Change in the Alpine Zone: A continuous, multi-proxy record of Holocene glacier activity and environmental change at Grand Teton National Park*”; \$5,000 (March 2012)

USNC/INQUA Early Career Scientist Travel Fellowship Award; “*financial support to attend XVIII INQUA Congress in Bern, Switzerland*”; \$650 (May 2011).

Icelandic Centre for Research (RANNIS) Graduate Student Fellowship “*3000 years of annually resolved climate from glacial lake Hvitarvatn*”; R09031/5264, ~\$61,000 (7,950,000 ISK); Advisors: G. Miller (Colorado) and Á. Geirsdóttir (Iceland); (June 2009-present)

Best Oral Presentation Award: University of Colorado Hydrologic Sciences Annual Research Symposium (2009).

IMF Marsden Award for excellence in Geology Research: Colby College (2005).

Colby College Geology Department Sophomore Class Award (2003).

Colby College Mineralogy Student of the Year (2003).

TEACHING and WORK EXPERIENCE

2012: *Teaching Assistant*, Geological Sciences, University of Colorado, Boulder, CO
Upper level Geographic Information Systems (GIS) course

2010-present: *Academic Tutor*, University of Colorado, Boulder, CO
Geology and Oceanography courses

2009-present: *Guest and Substitute Lecturer*, University of Colorado, Boulder, CO
Geology and Paleoclimatology courses

2008-2009: *Graduate Research Assistant*, Institute of Arctic and Alpine Research (INSTAAR), Boulder CO

2007: *Teaching Assistant*, Geological Sciences, University of Colorado, Boulder, CO
Introductory Field Geology lab course

2006-2007: *Field Instructor*, Teton Science Schools, Jackson, WY
Environmental educator and Instructor of natural sciences to Junior High and High School students in Grand Teton and Yellowstone National Parks. Subjects taught include glacial geology, fire ecology, community ecology, and natural history of the Teton and Yellowstone regions.

FIELD EXPERIENCE

Iceland: Dissertation field research (summer and winter seasons) in central highlands, south coast, and Vestfirðir regions (5 field seasons during 2008-2010).

Greenland: High Arctic Fields Course, Thule, Greenland. NSF sponsored intensive field course aimed at quantifying the coupling of the carbon and water cycles in peripheral environments of the Greenland Ice Sheet, and for determining net carbon flux at high latitudes. Field methods included measurements of GPP on micro and macro scales, meltwater stream chemistry analysis, soil pit excavation and evaluation, and installation of high precision GPS units (2005).

New Zealand: Undergraduate Research Project on the Tasman glacier, Southern Alps, New Zealand. Developed and executed an independent study for academic credit to perform an evaluation of recent fluctuations of the Tasman glacier, NZ. Fieldwork included glacier dimension and landform measurements and repeat photography (2003).

North America: Teton Range, WYO (2012); Volunteer Climbing Ranger, Denali West Buttress Expedition, Denali National Park, AK (2012); Research trips to Nebraska, Utah, Colorado Rockies (2007-2010); Field courses and research trips to Maine, Colby College (2004-2005); Field Assistant for Ph.D. student working

in Powder River Basin, Bighorn Basin, and Little Missouri Grasslands of Montana, Wyoming, and North Dakota (summer 2004).

ADDITIONAL SKILLS & INTERESTS

Math/Physics/Programming: I am comfortable using mathematics to describe geophysical systems and have experience building models in MATLAB to compute and plot numerical solutions. I am also comfortable building models using 'R' and ArcGIS software. I am very comfortable working with GIS and have taught introductory GIS courses to undergraduate students.

Glacier Travel/Mountaineering: A passionate mountaineer, I have skied and climbed in mountainous/glaciated regions, including the Swiss Alps, the Alaska Range, the Cascades, the Tetons and the New Zealand Alps. I am Wilderness First Responder (WFR) and trained in avalanche awareness, snow science, crevasse rescue, glacier travel, and first aid.

Foreign Language: French

CONFERENCE PRESENTATIONS

Larsen, D.J., Miller, G.H., Geirsdóttir, Á., Flowers, G.E., Bjornsson, H., 2012. Climate, Ice, and Mud: investigating the relationship between glacier activity and sediment flux using varved lake sediments, Iceland. *AGU Fall Meeting*.

Geirsdóttir, Á., Miller, G.H., **Larsen, D.J.**, Ólafsdóttir, S., 2012. North Atlantic Holocene climate inferences derived from PSV-synchronized marine and lacustrine records from Iceland. *AGU Fall Meeting*.

Larsen, D.J., Miller, G.H., Geirsdóttir, Á., 2012. Little Ice Age fluctuations of Langjökull ice cap from varved lake sediment. 11th International NCCR Climate Summer School, Ticino, Switzerland.

Geirsdóttir, Á., Miller, G.H., Ólafsdóttir, S., **Larsen, D.J.**, 2012. Paleomagnetic synchronization and land-sea paleoclimatic correlations from Iceland. *42nd Arctic Workshop*, Winter Park, CO.

Larsen, D.J., Miller, G.H., Geirsdóttir, Á., Ólafsdóttir, S., 2012. Non-linear Holocene climate evolution in the North Atlantic: A high-resolution, multi-proxy record of glacier activity and environmental change from Hvítárvatn, central Iceland. *42nd Arctic Workshop*, Winter Park, CO.

Geirsdóttir, Á., Thordarson, T., Miller, G.H., **Larsen, D.J.**, Ólafsdóttir, S., 2011. Non-linear Holocene climate behavior reconstructed from Icelandic lake sediment linked to both explosive and diffusive volcanism. *AGU Fall Meeting*, Abstract #V11F-2570.

Larsen, D.J., Miller, G.H., Geirsdóttir, Á., Ólafsdóttir, S., Thordarson, T., 2011. A high-resolution, multi-proxy record of Holocene glacier activity and environmental change from the central highlands of Iceland. *The XVIII INQUA Congress, Bern, Switzerland*.

Miller, G.H., Geirsdóttir, Á., Zhong, Y., Bliesner, B.O., **Larsen, D.J.**, Holland, M., Bailey, D., Thordarson, T., Refsnider, K.A., Lehman, S.J., Southon, J.R., 2011. Abrupt onset and intensification of the Little Ice Age linked to explosive

- volcanism and sea-ice/ocean feedbacks. *41st Arctic Workshop*, Montreal, Canada.
- Geirsdóttir, Á., Miller, G.H., **Larsen, D.J.**, Thordarson, T., Ólafsdóttir, S., Stoner, J.S., 2010. Synchronized high-resolution lacustrine records in Iceland show Non-Linear Response to Holocene Insolation. *AGU Fall Meeting*, Abstract #PP41A-1614.
- Larsen, D.J.**, Miller, G.H., Geirsdóttir, Á., Thordarson, T., 2010. A 3000-year annually resolved glacier and climate record from the proglacial lake Hvítárvatn, Iceland. *APEX (Arctic Paleoclimate and its Extremes) 4th International Meeting*, Hofn, Iceland
- Larsen, D.J.**, Miller, G.H., Geirsdóttir, Á., Ólafsdóttir, S., 2010. A multi-proxy record of Holocene climate and glacier activity from proglacial lake Hvítárvatn, central Iceland. *AGU Fall Meeting*, Abstract #PP21B-1685
- Miller, G.H., Geirsdóttir, Á., **Larsen, D.J.**, Thordarson, T., Refsnider, K.A., Lehman, S.J., Southon, J.R., 2010. Refining the timing and magnitude of Medieval warmth in the NW North Atlantic. *AGU Fall Meeting*, Abstract #PP43B-1684.
- Larsen, D.J.**, Miller, G.H., Geirsdóttir, Á., 2009. An Annually Resolved 3ka Record of Landscape Alteration, Climate, and Ice Sheet Activity from Glacial Lake Hvítárvatn, Iceland. *GSA Annual Meeting*, Abstract #5-11.
- Larsen, D.J.**, Miller, G.H., Geirsdóttir, Á., 2009. A 3ka Record of annually resolved climate and ice sheet activity from Glacial Lake Hvítárvatn, Iceland. *39th Arctic Workshop*, Lewiston, ME.
- Miller, G.H., **Larsen, D.J.**, Geirsdóttir, Á., Refsnider, K.A., Anderson, C., 2009. Rapid onset of the Little Ice Age summer cold in the North Atlantic derived from precisely dated ice cap records. *AGU Fall Meeting*, Abstract #PP52A-10.
- Ólafsdóttir, K.B., Geirsdóttir, Á., Miller, G.H., **Larsen, D.J.**, Axford, Y., Thordarson, T., 2009. Spectral Analysis of variations in laminae thickness in a 3000-year varved record from glacial lake Hvítárvatn, central Iceland. *AGU Fall Meeting*, Abstract #PP41B-1501.
- Geirsdóttir, Á., Miller, G.H., **Larsen, D.J.**, Axford, Y., Thordarson, T., 2008. Differential response times of climate proxies during the last 2000 years reconstructed from Icelandic lake systems. *AGU Fall Meeting*, Abstract #C54A-03.
- Schupack, B., Miller, G.H., **Larsen, D.J.**, 2008. Detecting the unseen: a new analytical approach towards the identification of cryptotephra in distal lacustrine archives. *38th Arctic Workshop*, University of Colorado, Boulder, CO.
- Larsen, D.J.**, Miller, G.H., Geirsdóttir, Á., Black, J.B., 2007. Laminated sediments from proglacial Lake Hvítárvatn in west central Iceland provide an opportunity for high resolution Holocene climate proxy. *37th Arctic Workshop*, Skaftafell, Iceland.
- Larsen, D.J.**, Goss, J.M., Humphreys, A.E., Russoniello, C.J., Weeks, S.S., and Gastaldo, R.A., 2005. The paleoecology and depositional environment of a Silurian mixed siliciclastic system: Ripogenus Dam, Maine. *Northeast GSA meeting*. Abstract #6-15.
- Larsen, D.J.**, Peppe, D.J., 2005. A re-evaluation of Taxodiaceous taxa present in a Late Paleocene deposit in central North Dakota: A scanning electron analysis of morphology and anatomy. *Northeast GSA meeting*. Abstract #33-6.